Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 02, Issue: 05 (SEP-OCT, 2022)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Influence of Potassium Nitrate (KNO_3) As Foliar Spray on Total NPK Uptake (kg/ha) by Wheat

(*Kshetrimayum Manishwari Devi)
College of Agriculture, Central Agricultural University, Imphal-795004
*Corresponding Author's email: ahenbisanakshetri@gmail.com

Abstract
A field experiment entitled "Effect of different concentrations of potassium nitrate (KNO_3) as foliar spray on growth and yield of wheat (*Triticum aestivum* L.)" was conducted during *rabi* season, 2012-2013 at the Research Farm, College of Agriculture, Central Agricultural University, Imphal. The treatments comprised of different concentrations of potassium nitrate (0.5%, 1%, 1.5%, 2%, 2.5% and 3%). The experiment was laid out in randomized block design with three replications and seven treatment combinations. Observations on total NPK uptake by wheat were recorded. It was observed that nitrogen uptake in foliar spray of KNO_3 @ 3% (111.17 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and phosphorus uptake KNO_3 @ 3% (14.08 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and 2%. Potassium uptake KNO_3 @ 3% (152.57 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and 2% and lowest were observed in control.

Keywords: potassium nitrate (KNO_3), wheat and NPK uptake

Introduction
Foliar application as spraying fertilizer solutions of suitable concentrations are prepared by dissolving fertilizer salts in water and they are sprayed over crop foliage. The solution absorbed by leaves which comes directly into plant system and help in rapid concentration of nutrient deficiency and boosting plant growth. Foliar fertilization is a widely used crop nutrition strategy of increasing importance worldwide. Foliar fertilization is also an important tool for the sustainable and productive management of crops. The foliar application of nutrients is more effective as compared to soil applied nutrients because of effective utilization by plant and minimum cost per unit area (Naran *et al*., 1997)

Potassium nitrate is a chemical compound with the chemical formula KNO_3. Potassium nitrate is fully water soluble and can be utilized completely by the plants without leaving unwanted residues. Because of its high solubility, it also can be used in foliar sprays. Potassium nitrate is an indispensable component in a well balancedfertigationprogramme. Nitrogen and Potassium are the main macronutrients that are taken by the plants in comparatively large quantities and these are usually deficient in most soil. So foliar spray of these elements is the best method of fertilizer application to control their losses from the soil and make them more and easily available to the plant and in turn increase the yield and quality of wheat grain (Zhigulev, 1992). K utilization by plants through foliar application is wellrecognized and is being practiced in agriculturally advanced countries (Ali et al., 2007). Consequently, there felt a direneed to evaluate the foliar potash application which is aneconomical way to increase yield by fulfilling the essentialpotassium need. On the other

hand, foliar application of potassium significantly increased number of spikes/m^2, numberand weight of grains/spike, 1000-grain weight, grain and straw yields of wheat (Sarkar and Bandyopadhyay, 1991 and EL-Defan, *et al*., 1999).

Methodology

A field experiment was conducted to study the "Effect of different concentrations of potassium nitrate (KNO_3) as foliar spray on growth and yield of wheat (*Triticum aestivum* L.)" at the Research Farm of College of Agriculture, Central Agricultural University, Imphal during *rabi* season, 2012-13. The material used and the methodology adopted for the research are detailed below.

Experimental treatments: The field experimental consisted of seven treatments. Details of the experimental treatments along with symbols used for this experiment are given here as follows:

Treatment notation	Treatment details
T_1	Control (spray of water)
T_2	KNO_3 @ 0.5%
T_3	KNO_3 @ 1%
T_4	KNO_3 @ 1.5%
T_5	KNO_3 @ 2%
T_6	KNO_3 @ 2.5%
T_7	KNO_3 @ 3%

Layout and design: The detail of the layout plan and design are given as follows:

Experimental design	:	Randomized Block Design (RBD)
Number of replication	:	3 (three)
Number of treatment	:	7 (seven)
Gross experimental area	:	369.75 m^2
Net experimental area	:	252 m^2
Plot size	:	3 X 4 m^2
Total number of plots	:	21
Variety	:	VL-804

Spraying of potassium nitrate (KNO_3): Maximum tillering stage and late jointing stages

Fig. General view of experimental field

Fig. Potassium nitrate (KNO_3) @3% treated plot

Results and Discussion

Table1 Influence of potassium nitrate (KNO_3) as foliar spray on total NPK uptake (kg/ha) by wheat

Treatment	Total Nitrogen uptake (kg/ha)	Total Phosphorus uptake (kg/ha)	Total Potassium uptake (kg/ha)
T_1	38.45	7.55	71.29
T_2	60.71	11.42	116.16
T_3	73.39	12.33	123.03
T_4	99.65	13.15	130.42
T_5	109.10	13.34	137.47
T_6	109.74	13.50	140.51
T_7	111.17	14.08	142.57
SEM (±)	4.80	0.45	5.15
CD (P=0.05)	14.80	1.38	15.88

Treatment Detailed:

T_1 – Control (spray of water)
T_2 – KNO_3 @ 0.5%
T_3 – KNO_3 @ 1 %
T_4 – KNO_3 @ 1.5%
T_5 – KNO_3 @ 2 %
T_6 – KNO_3 @ 2.5%
T_7 – KNO_3 @ 3 %
DAS – Days after sowing

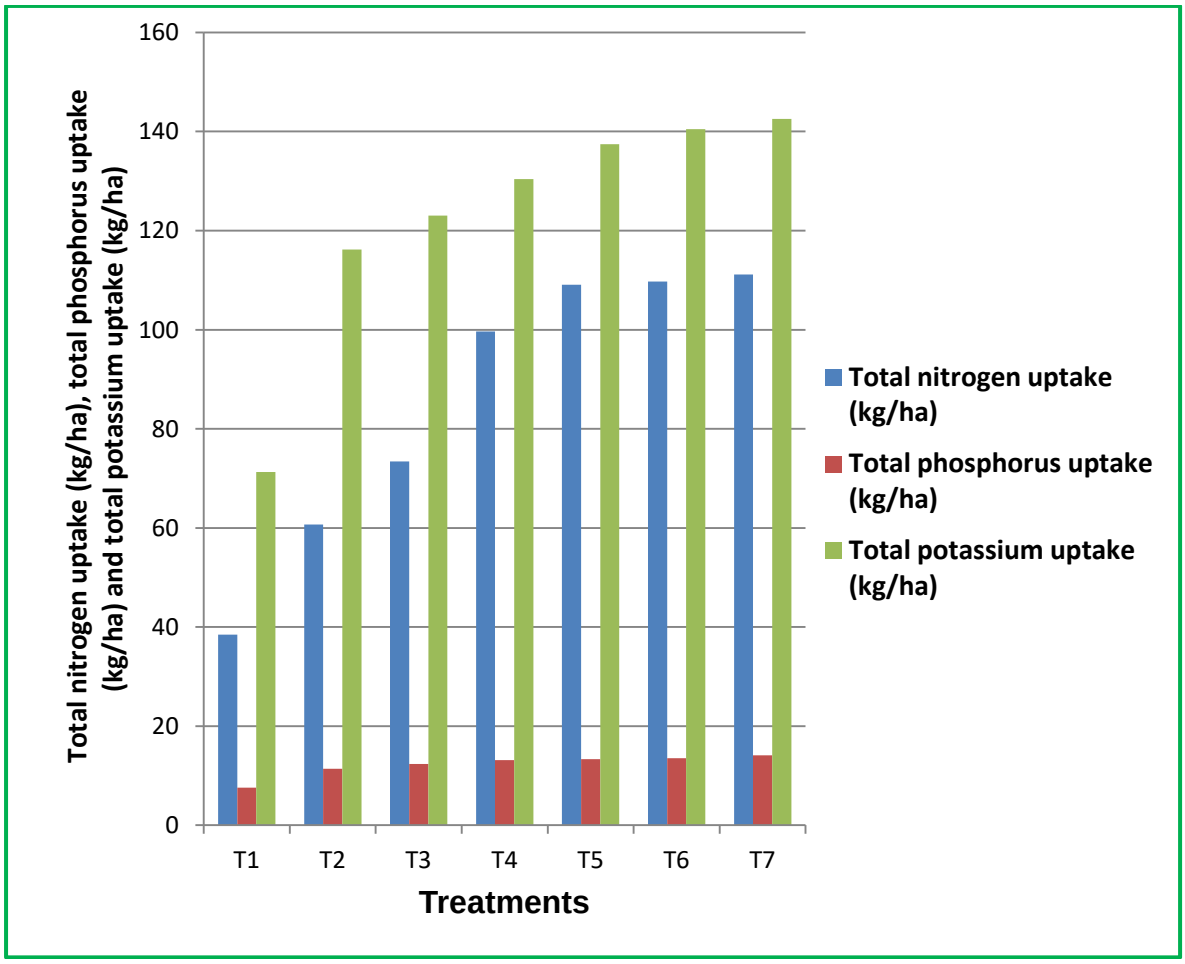

Fig.1: Influence of potassium nitrate (KNO_3) as foliar spray on total NPK uptake (kg/ha) by wheat

Total nutrient uptake (kg/ha)

Nitrogen uptake (kg/ha): The data recorded for the total nitrogen uptake are presented in Table1 and graphically presented in Fig.1. Control could not show significant effect on the total nitrogen uptake. Numerically more nitrogen uptake was observed in foliar spray of KNO_3 @ 3% (111.17 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and 2%. The lowest was observed at control (38.45 kg/ha).

Phosphorus uptake (kg/ha): The data recorded for the total phosphorus uptake are presentedin Table1 and graphically presented in Fig.1. Control could not show significant effect on the total phosphorus uptake. Numerically more phosphorus uptake was observed in foliar spray of KNO_3 @ 3% (14.08 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and 2%. The lowest was observed at control (7.55kg/ha).

Potassium uptake (kg/ha) : The data recorded for the total potassium uptake are presented in Table1and graphically presented in Fig.1. Control could not show significant effect on the total potassium uptake. Numerically more potassium uptake was observed in foliar spray of KNO_3 @ 3% (152.57 kg/ha) and it remained at par with the foliar application of KNO_3 2.5 % and 2%. The lowest was observed at control (`171.29 kg/ha).

Conclusion

Potassium nitrate (KNO_3) as a foliar application helps in improving NPK uptake by wheat. Foliar application of potassium nitrate (KNO_3) @ 3% at maximum tillering stage and late jointing stage helps in better nutrient uptake of Nitrogen, Phosphorus and Potassium.